PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF APPEALS AND INTERFERENCES

Application No.:	10/732,850
Filing Date:	December 10, 2003
Applicant:	Marvin L. Green et al.
Group Art Unit:	1714
Examiner:	Patrick D. Niland
Title:	Use of Urea Crystals for Non-Polymeric Coatings
Attorney Docket:	IN-5587 HDP Docket No.0906S-337

Director of the United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

Amended Appeal Brief Under 37 C.F.R. § 41.37

Sir:

In answer to the Notification of Non-Compliant Appeal Brief mailed April 12, 2007, Applicants file this Amended Appeal Brief that includes the two pages from the Reply mailed October 25, 2006 that contain the quotations referred to in the Evidence Appendix.

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Real Party in Interest

The real party in interest is BASF Corporation, to which the inventors assigned all rights in this invention. The assignment was recorded by the USPTO on December 10, 2003 at reel 014795, frame 0489.

Related Appeals and Interferences

There are no related appeals or interferences.

Status of Claims

All of the pending claims, claims 1-15, stand finally rejected. This appeal is taken as to all of the pending claims.

Status of Amendments

No amendment was filed after the final rejection.

Summary of Claimed Subject Matter

Independent claims 1 and 13 are pending. Claim 1 is to a thermosetting, non-polymeric coating composition comprising at least one monomeric material, at least one crosslinker reactive with the at least one monomeric material, and a crystalline reaction product of an amine and an isocyanate. Page 3, lines 6-11. The monomeric material has active hydrogen groups such as carbamate groups, terminal urea groups, hydroxyl groups, carboxyl groups, mercapto groups, primary and secondary amine groups, and amides of primary amines. Page 5, lines 1-10. The crystalline reaction product may be, for example, a reaction product of a monoamine such as the reaction product of benzyl amine with hexamethylene diisocyanate. Example 2, page 22, line 7 to page 23, line 3.

Claims 2-12 are dependent on claim 1.

Independent claim 13 claims a method of coating a substrate with a coating composition by applying to the substrate a layer of thermosetting, non-polymeric coating composition that has been described for claim 1 and curing the applied layer to produce a cured coating layer on the substrate. Page 4, lines 1-7; see also page 18, lines 3-13.

Claims 14 and 15 are dependent on claim 15.

Grounds of Rejection to Be Reviewed on Appeal

Claims 1-3 and 7-15 stand rejected under 35 U.S.C. § 102(b) as anticipated by Boisseau et al., U.S. Patent Application Publication No. 2002/0155278.

Claims 1-15 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Boisseau et al., U.S. Patent Application Publication No. 2002/0155278 in view of Green et al., U.S Patent No. 5,872,195 and Ohrbom et al., U.S. Patent No. 5,756,213.

Argument

I. Claims 1-3 and 7-15 are not anticipated by the Boisseau publication because the Boisseau publication does not teach or disclose a non-polymeric coating composition comprising a monomeric material having a plurality of active hydrogen groups.

Appellants' coating composition is non-polymeric, unlike the polymeric and oligomeric coatings described in Appellants' background, page 2, paragraphs [0003] and [0004] and exemplified in the Boisseau publication.

In the Reply mailed June 8, 2006, Appellants responded to a rejection for indefiniteness by asserting that the monomeric material common to all of the claims is not the product of a polymerization reaction where multiple monomers are linked together. Specifically, Appellants asserted that the monomeric material is not an oligomer or polymer of repeating subunits. Reply mailed June 8, 2006, at page 2.

Furthermore, Appellants have submitted in the Reply mailed October 25, 2006 a discussion of oligomers from the Encyclopedia of Polymer Science and Engineering (2d Ed.), Vol. 10, p. 432 (1988) that recognize oligomers as a low molecular weight polymerization product of monomers:

> The International Union of Pure and Applied Chemistry (IUPAC) defines oligomer as a substance composed of molecules containing a few of one or more species of atoms or groups of atoms (constitutional units) repetitively linked to each other (a). This does not specify an absolute degree of polymerization or molecular weight that distinguishes an oligomer from a polymer, but the IUPAC definition further states that the physical properties of an oligomer vary with the addition or removal of one or a few of the constitutional units from its molecules. This structure-property definition is perhaps the most meaningful definition of an

> oligomer. *The conversion of a monomer or a mixture of monomers into an oligomer* is defined as oligomerization. This definition does not imply any constraints on the oligomer polydispersity. Therefore, although monodisperse oligomers provide more valuable information than polydisperse oligomers, the latter are still important.

Encyclopedia of Polymer Science and Engineering (2d Ed.), Vol. 10, p. 432 (1988) (emphasis added).

Appellants further submitted the definition of a monomer from the same source in the Reply mailed October 25, 2006:

> A monomer is defined as a compound consisting of molecules each of which can provide one or more constitutional units of a polymer (or oligomer) (1).

Encyclopedia of Polymer Science and Engineering (2d Ed.), Vol. 10, p. 25 (1988).

Against these authorities the Examiner posits his self-made definition: "The oligomers of the reference react further to give higher molecular weight polymer when cured and are therefore necessarily . . . 'monomeric'." This Examiner's opinion is, however, not evidence; further, it is contrary to Appellant's specification and the IUPAC definitions of these materials.

The Boisseau publication discloses only polymeric coating compositions. Moreover, the Boisseau publication does not disclose coating compositions comprising monomeric material having a plurality of active hydrogen groups; instead, the Boisseau publication discloses film forming polymers and oligomers. Page 4, para. [0048], first sentence, para. [0050], first sentence & para. [0052] first sentence; page 5, para. [0055] first sentence; page 9, para. [0098].

Because the Boisseau publication does not teach or disclose every element of the present claims, Applicants submit that the rejection should be REVERSED.

II. Claims 1-15 are patentable over the combination of the Boisseau publication, Green patent, and Ohrbom patent because this combination does not teach or disclose a non-polymeric coating composition.

As discussed above, the Boisseau publication teaches polymeric coating compositions. The Green patent teaches a coating composition containing a polymer resin, curing agent and compound (c). Green patent, Abstract; col. 2, lines 1-11; col. 5, lines 28-36; claim 1. The Ohrbom patent is cited for its teaching in columns 2-8 as allegedly teaching something "which falls within the scope of the instant claims 5-6"; however, Appellants believe that Ohrbom instead teaches reacting a compound with hydroxy and carbamate functionality with a dialkyl carbonate, cyclic carbonate, or carbon dioxide, none of which is a lactone or hydroxy carboxylic acid. Furthermore, there is no motivation to combine the teachings of these documents, as the Examiner's general "expect the benefits of these film formers" is nothing more than the old "invitation to experiment" standard.

In view of these deficiencies, Applicants submit that the rejection should be REVERSED.

Conclusion

The present claims are patentable over the cited art. Appellants, therefore, respectfully petition this Honorable Board to reverse the final rejection of the claims on each ground and to indicate that all claims are allowable.

Respectfully submitted,

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Claim Appendix

Copy of the Claims Appealed

1. A thermosetting, non-polymeric coating composition comprising at least one monomeric material having a plurality of active hydrogen groups, at least one crosslinker reactive with the at least one monomeric material, and a crystalline reaction product of an amine and an isocyanate.

2. A thermosetting, non-polymeric coating composition according to claim 1, wherein the active hydrogen groups are selected from carbamate groups, terminal urea groups, hydroxyl groups, carboxylic acid groups, and combinations thereof.

3. A thermosetting, non-polymeric coating composition according to claim 1, wherein the crosslinker is reactive with the crystalline reaction product.

4. A thermosetting, non-polymeric coating composition according to claim 1, wherein the at least one monomeric material having a plurality of active hydrogen groups comprises a carbamate-functional or terminal urea-functional monomeric material comprising at least two functional groups, at least one of which is a carbamate or terminal urea group that is the reaction product of (1) an hydroxyl group of a first compound that is the result of a ring-opening reaction between a compound with an epoxy group and a compound with an organic acid group and (2) cyanic acid or a carbamate or urea group-containing compound.

5. A thermosetting, non-polymeric coating composition according to claim 1, wherein the at least one monomeric material having a plurality of active hydrogen groups comprises a carbamate-functional or terminal urea-functional material that is the reaction product of (1) a compound comprising a carbamate or terminal urea group and an active hydrogen group that is reactive with (2), and (2) a lactone or an hydroxy carboxylic acid.

6. A thermosetting, non-polymeric coating composition according to claim 1, wherein the at least one monomeric material having a plurality of active hydrogen groups comprises a carbamate-functional or terminal urea-functional material that is the reaction product of a first material (A) that is prepared by reacting (1) a compound comprising a primary carbamate or terminal urea group and an hydroxyl group and (2) a lactone or a hydroxy carboxylic acid reacted with a second material (B) that is reactive with hydroxyl groups on a plurality of molecules of compound (1), but that is not reactive with the carbamate or urea groups on compound (1).

7. A thermosetting, non-polymeric coating composition according to claim 1, wherein the at least one monomeric material having a plurality of active hydrogen groups comprises a carbamate-functional or terminal urea-functional material that is the reaction product of (1) a first material that is the reaction product of a mixture including at least a polyisocyanate and an active hydrogen-containing chain extension agent with (2) a compound comprising a group that is reactive with said first material and a

carbamate or terminal urea group or group that can be converted to a carbamate or terminal urea group.

8. A thermosetting, non-polymeric coating composition according to claim 1, wherein the at least one monomeric material having a plurality of active hydrogen groups comprises a carbamate-functional material having at least two carbamate groups and a hydrocarbon moiety with about 24 to about 72 carbon atoms,

9. A thermosetting, non-polymeric coating composition according to claim 1, wherein the amine is a primary monoamine.

10. A thermosetting, non-polymeric coating composition according to claim 1, wherein the amine is selected from the group consisting of benzylamine, ethylamine, propylamine, butylamine, pentylamine, hexylamine, methylbutylamine, ethylpropylamine, ethylbutylamine, and combinations thereof.

11. A thermosetting, non-polymeric coating composition according to claim 1, wherein the isocyanate comprises 1,6-hexamethylene diisocyanate.

12. A thermosetting, non-polymeric coating composition according to claim 1, further comprising fumed silica.

13. A method of coating a substrate with a coating composition, having steps of:

applying to the substrate a layer of thermosetting, non-polymeric coating composition comprising at least one monomeric material having a plurality of active hydrogen groups, at least one crosslinker reactive with the at least one monomeric material, and a crystalline reaction product of a primary monoamine and an isocyanate; and

curing the applied layer to produce a cured coating layer on the substrate.

14. A method according to claim 13, wherein the coating composition further comprises fumed silica.

15. A method according to claim 13, wherein the thermosetting, non-polymeric coating composition is applied as a clearcoat layer over a previously applied basecoat coating layer.

EVIDENCE APPENDIX

Evidence entered by examiner and relied on by appellant

Appellants quotation in the Reply mailed October 25, 2006 of a discussion of oligomers from the Encyclopedia of Polymer Science and Engineering (2d Ed.), Vol. 10, p. 432 (1988) and definition of monomer from the Encyclopedia of Polymer Science and Engineering (2d Ed.), Vol. 10, p. 25 (1988), both quoted again in the argument above.

The present compositions and methods of independent claims 1 and 13 and their dependent claims all include a thermosetting, non-polymeric coating composition comprising, among other features, at least one monomeric material having a plurality of active hydrogen groups. The present compositions and methods are in contrast to very low molecular weight polymeric or oligomeric materials, which are particularly susceptible to sagging during the initial stages of baking (i.e., curing) due to their rheology profile on heating. Paragraph [0004].

Thus, the terms polymeric, oligomeric, and monomeric are used separately and distinctly in the present specification. The present specification distinguishes a monomeric material versus a polymeric or oligiomeric material; therefore, when viewed by a skilled artisan, there is no confusion or inclusion of an oligomeric material within the meaning of a monomeric material.

In addition, a skilled artisan would not connote the oligomers of Boisseau as monomers. There is no confusion or overlap between oligomer and monomer as used in the present disclosure and claims. As typically recognized in the art, the term oligomer refers to short polymers, typically of a few monomer units:

> The International Union of Pure and Applied Chemistry (IUPAC) defines oligomer as a substance composed of molecules containing a few of one or more species of atoms or groups of atoms (constitutional units) repetitively linked to each other (1). This does not specify an absolute degree of polymerization or molecular weight that distinguishes an oligomer from a polymer, but the IUPAC definition further states that the physical properties of an oligomer vary with the addition or removal of one or a few of the constitutional units from its molecules. This structure-property definition is perhaps the most meaningful definition of an oligomer. The conversion of a monomer or a mixture of monomers into an oligomer is defined as oligomerization. This definition does not imply any constraints on the oligomer polydispersity. Therefore, although monodisperse oligomers provide more valuable information than polydisperse oligomers, the latter are still important.

(Encyclopedia of Polymer Science and Engineering, 2nd Ed., Vol. 10, p. 432, Copyright © 1988 by John Wiley & Sons)

Furthermore, "[a] monomer is defined as a compound consisting of molecules each of which can provide one or more constitutional units of a polymer (or oligomer) (1)." Id at 25. Likewise, the illustrative examples of monomeric materials provided in the present disclosure in paragraphs [0013] – [0027] comport with these definitions and a skilled artisan would invariably conclude that a monomeric material (as used in independent claims 1 and 13) is not and does not include an oligomeric material.

The Boisseau et al. reference discloses coating compositions and coating methods having a film-forming component (a). The Boisseau film-forming component (a) may be polymeric or oligomeric and will generally comprise one or more compounds or components having a number average molecular weight of from 900 to 1,000,000, for example. Boisseau paragraph [0048]. Examples of polymer resins are listed in Boisseau paragraph [0051]. The molecular weight of polymers refers to the number average molecular weight (Boisseau paragraph [0052]); i.e., the number average molecular weight is the total weight of the sample divided by the number of molecules in the sample, thereby averaging a mixed population of polymers formed of different numbers of repeating subunits. Boisseau also discloses how to prepare polymers (for use as the film-forming component) from monomers. See Boisseau paragraph [0054]; see also paragraphs [0063] to [0098] for preferred carbamate functional polymers, polyester polymers, and polyurethane polymers. Furthermore, the only reference to monomers in Boisseau is in terms of using them to prepare polymers for use as the film-forming component. See Boisseau paragraphs [0052], [0054], and [0055].

RELATED PROCEEDINGS APPENDIX

None.